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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

December 6, 1993

William F. Caton, Acting Secretary
Federal Communications Commission
1919 M Street, N.W. - Room 222
Washington, D.C. 20554

Re: PP Docket No. 93-253, Competitive Bidding

Dear Mr. Caton:

On December 6, 1993, E.Y. Snowden and Jim Tuthill, from Pacific Bell, and Paul Milgrom of Cornerstone Research met with Robert Pepper, David Reed, Evan Kwerel, John Williams, Jonathan Levy and Marc Martin of the Office of Plans and Policy, Tom Stanley and David Siddall of the Officer of Engineering and Technology, Kent Nakamura of the Private Radio Bureau, Jonathan Cohen and Jim Coltharp regarding several issues in the subject proceeding. They distributed the attached written material.

I am filing two copies of this letter and its attachment in accordance with Section 1.1206(a) of the Commission's rules. Please contact me if you have any questions concerning this matter.

Sincerely,

William F. Adler

Attachment

CC (w/o attachment):
David Reed
Evan Kwerel
John Williams
Jonathan Levy
Marc Martin
Tom Stanley
David Siddall
Jonathan Cohen
Jim Coltharp
Kent Nakamura

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Ex Parte Presentation

by Paul Milgrom
for Pacific Bell and Nevada Bell
December 6, 1993

Contents

Major Design Points. We reaffirm our written positions that (1) a simultaneous ascending bid auction, in which bidding on all broadband PCS licenses closes together or nearly so, is superior to a sequence of auctions, (2) combinatorial bidding is unnecessary and should not be allowed, and (3) the pace of the auction should be slow enough to allow bidders to deliberate during the course of the auction.

Worst-Case Timing for the Milgrom-Wilson Design. We analyze the Milgrom-Wilson design to evaluate the pace of the auction and the time necessary for completion.

Spreadsheet Program. These pages illustrate the logic and output of a working MacIntosh Excel spreadsheet that implements our proposed auction design.

Major Design Points

- Simultaneous auctions with bids not more often than once per day are superior to sequential auctions because they...
  - entail less guesswork by bidders and make efficient allocations more likely
  - develop information about values during the course of the auction, alleviating the winner's curse
  - allow bidders to evaluate and pursue backup strategies during the course of the auction
  - are much less subject to strategic manipulation
- Combinatorial bidding should not be allowed because...
  - full combinatorial bidding is non-transparent and cannot be implemented reliably
  - limited combinatorial bidders unfairly get "two bites at the apple"
  - the various proposed forms of combinatorial bidding entail predictable inefficiencies or inequities, or both
  - simultaneous auctions promote efficiency without combinatorial bids.
- The pace of the auction should be deliberate because...
  - large financial stakes require close supervision by bidders' financial officers and boards of directors
  - complexity of valuing combinations of licenses require real-time planning by professional staffs
  - bidders' problems in participating in a fast-paced auction would result in less efficient allocations, more aftermarket trading, and lower prices

Worst-Case Timing in the Milgrom-Wilson Design

- Let T be the total spectrum available for bidding, measured in MHz-POPs. Let E be the total current eligibility of the bidders in MHz-POPs. Define $e = E/T$ to be the *eligibility ratio*.

- The fraction of activity accounted for by new bids in each round cannot be less than $1 - 3/e$ during phase I, $1 - 1.5/e$ during phase II, or $1 - 1/e$ during phase III.

- A *conservative* version of the activity rule designed to avoid worst-case delays might entail minimum bid increments of x per MHz-POP and a phase-change rule that prescribes changes when the total highest bids rise by less than, say, $100 million per round.

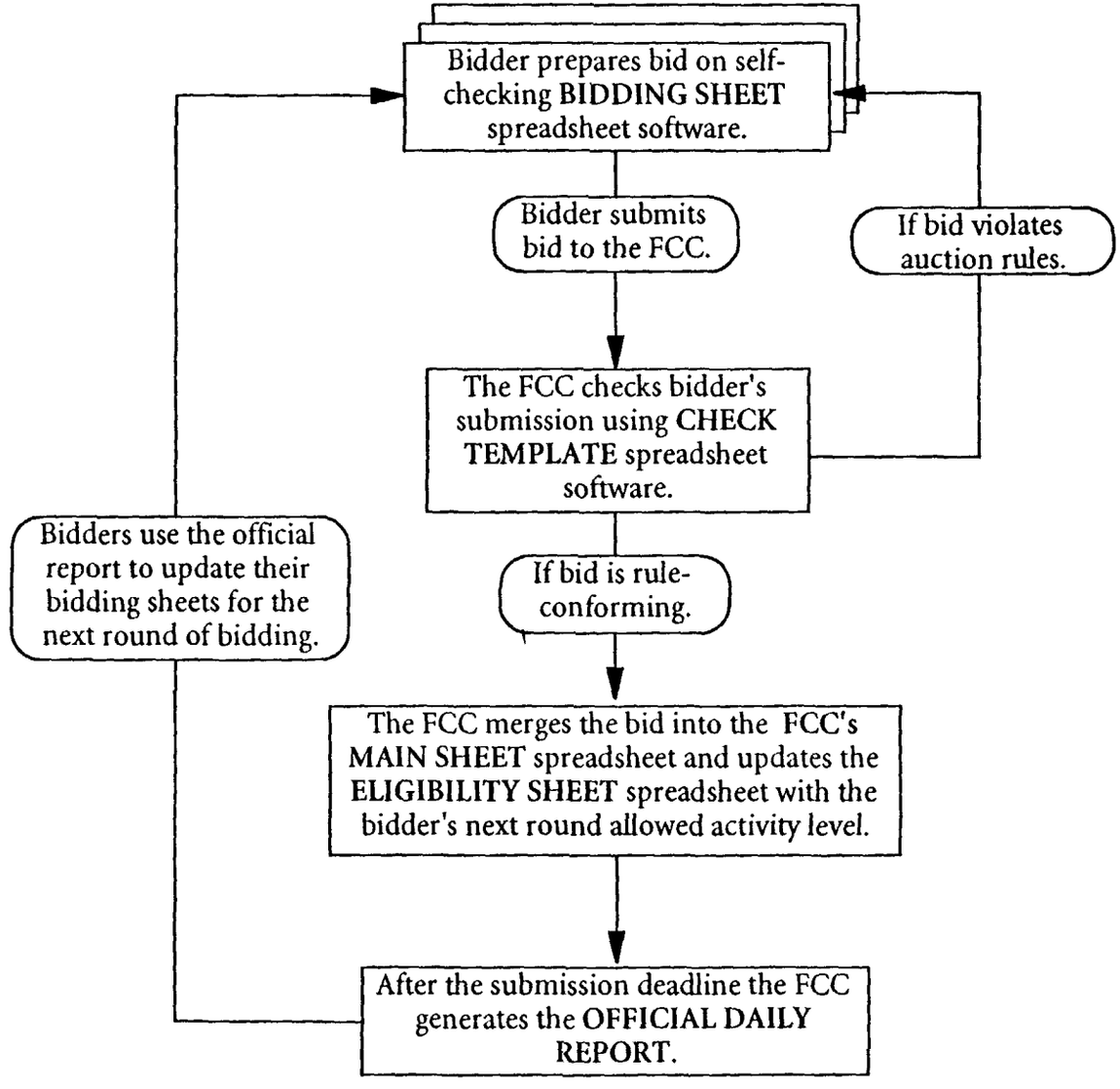
  • The activity rule guarantees a minimum level of new bidding activity at each round while the eligibility ratio e remains high.

  • The minimum bid increment x ensures that this new bidding activity translates into genuine progression of bids within the phase.

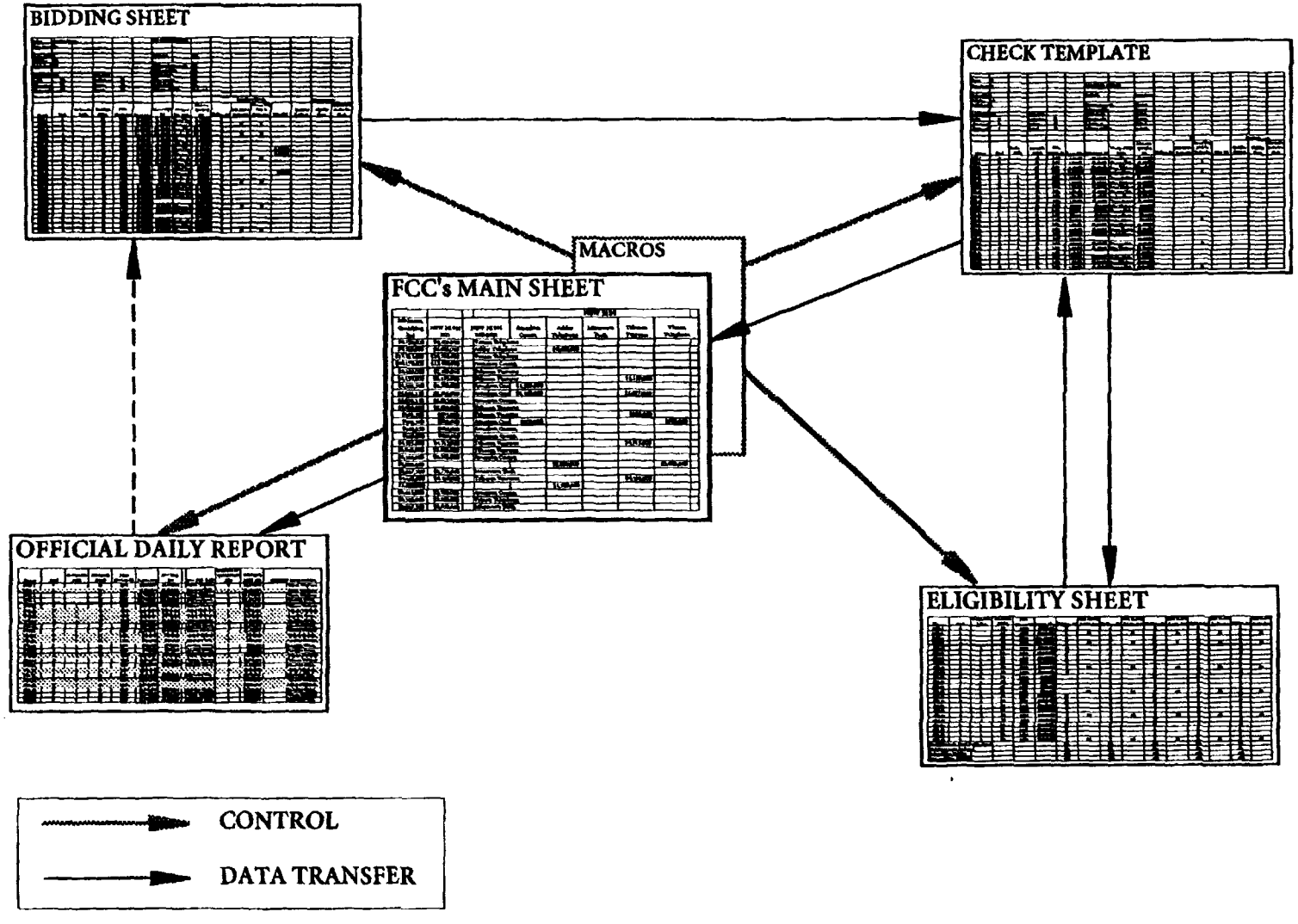
  • The phase change rule advances the pace as e falls and also ensures that, on almost every day until phase III, total bids increase by at least $100 million.

  • The sealed bid closing rule brings the auction to a smooth close late in stage III in case bidding remains active on only a few low-value licenses and total bids have ceased to progress.

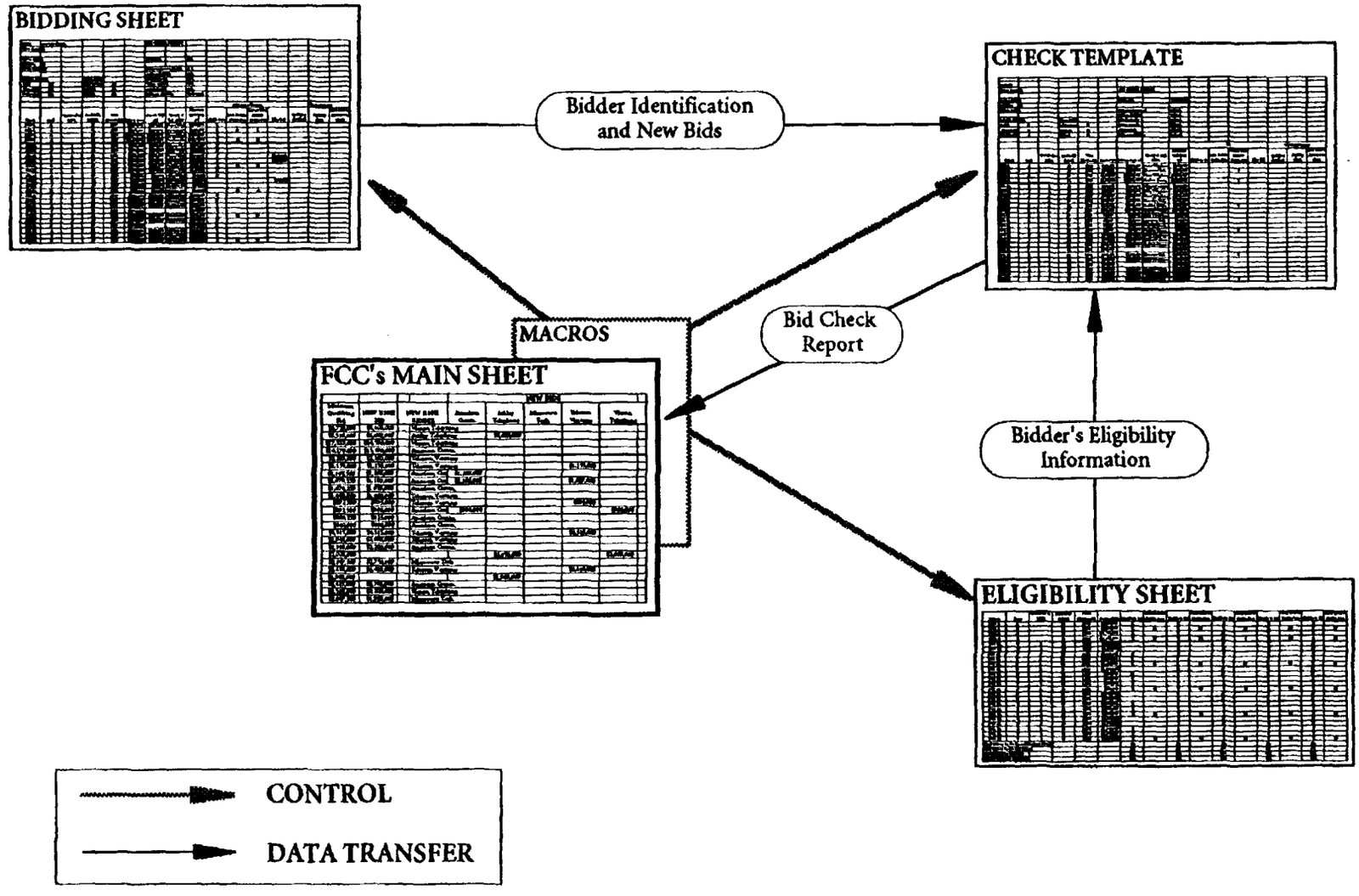
Overview of a Single Round of Bidding Using Spreadsheet Software



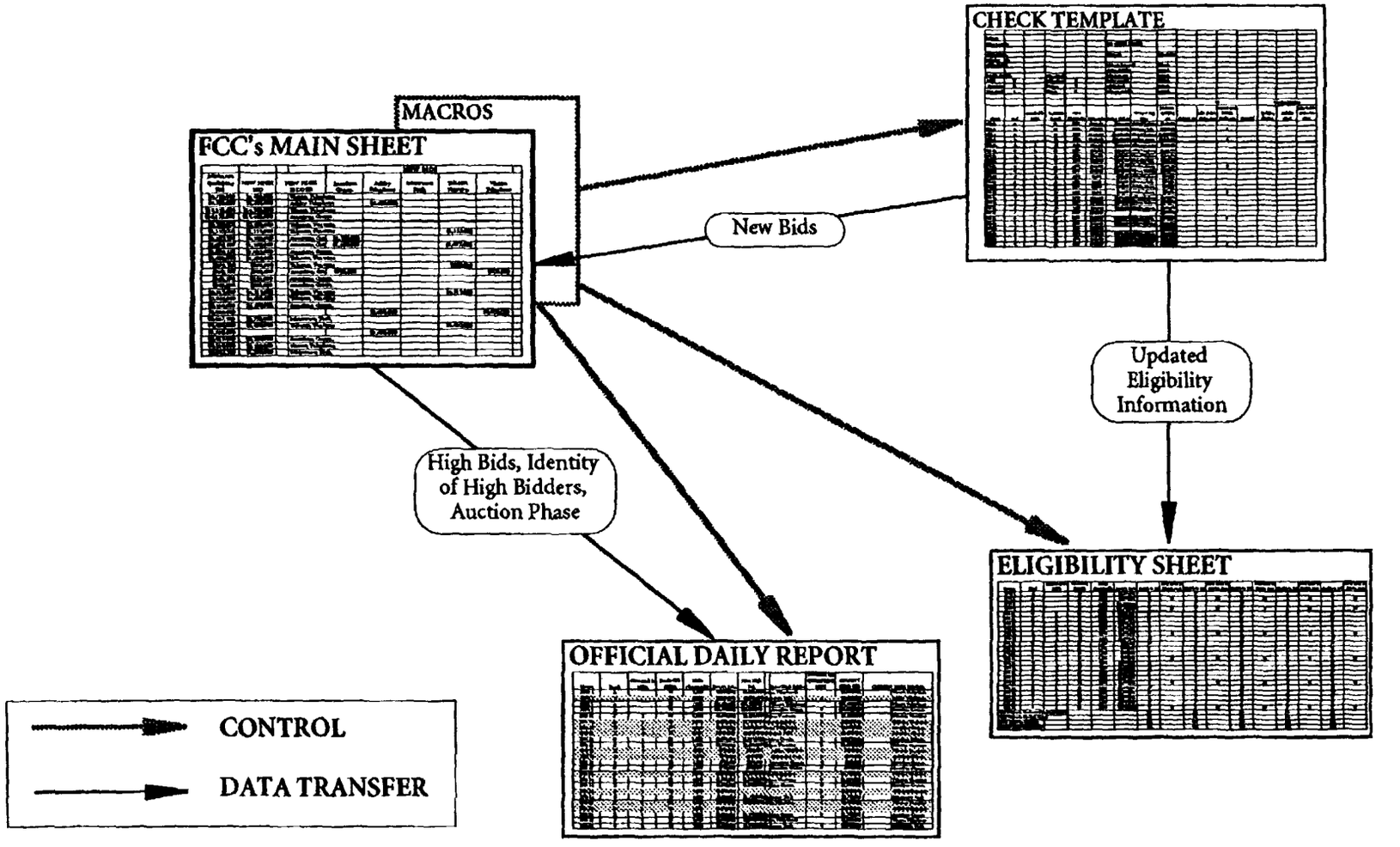
PCS Spectrum Auction Software



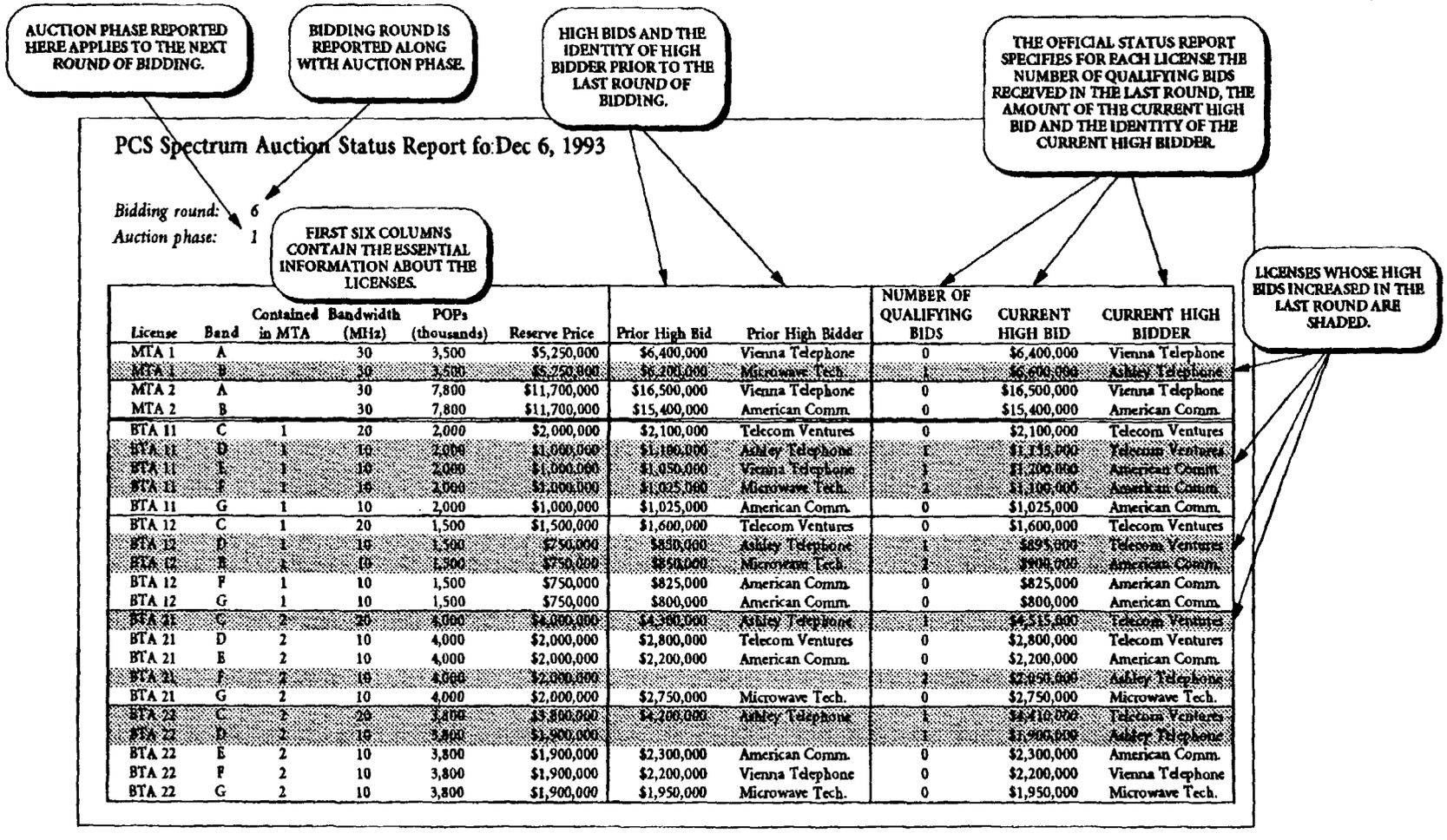
CHECKING BID SUBMISSION



Integrating New Bids and Generating Official Report



THE OFFICIAL DAILY REPORT



PCS Spectrum Auction Status Report fo:Dec 6, 1993

Bidding round: 6
Auction phase: 1

License	Band	Contained in MTA	Bandwidth (MHz)	POPs (thousands)	Reserve Price	Prior High Bid	Prior High Bidder	NUMBER OF QUALIFYING BIDS	CURRENT HIGH BID	CURRENT HIGH BIDDER
MTA 1	A		30	3,500	$5,250,000	$6,400,000	Vienna Telephone	0	$6,400,000	Vienna Telephone
MTA 1	B		30	3,500	$5,250,000	$6,200,000	Microwave Tech.	1	$6,600,000	Ashley Telephone
MTA 2	A		30	7,800	$11,700,000	$16,500,000	Vienna Telephone	0	$16,500,000	Vienna Telephone
MTA 2	B		30	7,800	$11,700,000	$15,400,000	American Comm.	0	$15,400,000	American Comm.
BTA 11	C	1	20	2,000	$2,000,000	$2,100,000	Telecom Ventures	0	$2,100,000	Telecom Ventures
BTA 11	D	1	10	2,000	$1,000,000	$1,100,000	Ashley Telephone	1	$1,315,000	Telecom Ventures
BTA 11	E	1	10	2,000	$1,000,000	$1,050,000	Vienna Telephone	1	$1,200,000	American Comm.
BTA 11	F	1	10	2,000	$1,000,000	$1,025,000	Microwave Tech.	2	$1,100,000	American Comm.
BTA 11	G	1	10	2,000	$1,000,000	$1,025,000	American Comm.	0	$1,025,000	American Comm.
BTA 12	C	1	20	1,500	$1,500,000	$1,600,000	Telecom Ventures	0	$1,600,000	Telecom Ventures
BTA 12	D	1	10	1,500	$750,000	$850,000	Ashley Telephone	1	$895,000	Telecom Ventures
BTA 12	E	1	10	1,500	$750,000	$850,000	Microwave Tech.	2	$900,000	American Comm.
BTA 12	F	1	10	1,500	$750,000	$825,000	American Comm.	0	$825,000	American Comm.
BTA 12	G	1	10	1,500	$750,000	$800,000	American Comm.	0	$800,000	American Comm.
BTA 21	C	2	20	4,000	$4,000,000	$4,300,000	Ashley Telephone	1	$4,515,000	Telecom Ventures
BTA 21	D	2	10	4,000	$2,000,000	$2,800,000	Telecom Ventures	0	$2,800,000	Telecom Ventures
BTA 21	E	2	10	4,000	$2,000,000	$2,200,000	American Comm.	0	$2,200,000	American Comm.
BTA 21	F	2	10	4,000	$2,000,000			1	$2,050,000	Ashley Telephone
BTA 21	G	2	10	4,000	$2,000,000	$2,750,000	Microwave Tech.	0	$2,750,000	Microwave Tech.
BTA 22	C	2	20	3,800	$3,800,000	$4,200,000	Ashley Telephone	1	$4,410,000	Telecom Ventures
BTA 22	D	2	10	3,800	$1,900,000			1	$1,900,000	Ashley Telephone
BTA 22	E	2	10	3,800	$1,900,000	$2,300,000	American Comm.	0	$2,300,000	American Comm.
BTA 22	F	2	10	3,800	$1,900,000	$2,200,000	Vienna Telephone	0	$2,200,000	Vienna Telephone
BTA 22	G	2	10	3,800	$1,900,000	$1,950,000	Microwave Tech.	0	$1,950,000	Microwave Tech.

AMERICAN COMM. BIDDING SHEET

ACTIVITY RULE WAIVER REQUEST IS ENTERED HERE.

SOFTWARE USES BIDDER'S NAME TO IDENTIFY THE BID.

ALLOWED ACTIVITY IN THE NEXT ROUND IS CALCULATED AUTOMATICALLY.

BIDDING SHEET IS SELF CHECKING. BID CHECK REPORT SUMMARIZES AND ITEMIZES THE CHECKS PERFORMED.

MINIMUM QUALIFYING BIDS ARE CALCULATED USING CURRENT HIGH BIDS AND THE MINIMUM INCREMENT RULE.

WARNING MESSAGES ARE PRINTED NEXT TO THOSE NEW BIDS THAT VIOLATE RULES.

ALASKA TELEPHONE'S NEW BIDS CONFORM TO THE RULES OF AUCTION.

BANDWIDTH CURRENTLY HELD IN EACH SERVICE AREA IS CALCULATED AUTOMATICALLY.

FCC'S DAILY REPORT IS USED TO UPDATE INFORMATION ON CURRENT HIGH BIDS.

PCS Spectrum Auction Bidding Sheet

Bidder: American Comm.
Waiver Request: No

Auction Phase: 1
Multiplier: 3.0
Activity Level: 417

PopMHz Eligibility	
Initial	452
Current round	452
Next round	452

Waiver Used	
2nd Previous	No
Previous	No
Current	No

BID CHECK REPORT

OVERALL	O.K.
Minimum increment rule:	O.K.
Bidding eligibility:	O.K.
MHz limit rule:	O.K.
Waiver use rule:	O.K.
Activity level:	O.K.
MHz-pop eligibility	Unchanged.

License	Band	Contained in MTA	Bandwidth (MHz)	POPs (thousands)	Reserve Price	Current High Bid	Identity of High Bidder	Minimum Qualifying Bid	American Comm. Eligible to Bid	American Comm. MHz Limit in Service Area	American Comm. Current Total MHz in Service Area	American Comm. New Bid	Warning Messages: Qualifying Bid Check	Warning Messages: Eligibility Check	Warning Messages: MHz Limit in Service Area Check
MTA 1	A		30	3,500	$5,250,000	$6,400,000	Vienna Telephone	$6,720,000	Y						
MTA 1	B		30	3,500	$5,250,000	$6,200,000	Microwave Tech.	$6,510,000	Y	30	0				
MTA 2	A		30	7,800	$11,700,000	$16,500,000	Vienna Telephone	$17,325,000	Y						
MTA 2	B		30	7,800	$11,700,000	$15,400,000	American Comm.	$16,170,000	Y	30	30				
BTA 11	C	1	20	2,000	$2,000,000	$2,100,000	Telecom Ventures	$2,205,000	N						
BTA 11	D	1	10	2,000	$1,000,000	$1,100,000	Ashley Telephone	$1,155,000	N						
BTA 11	E	1	10	2,000	$1,000,000	$1,050,000	Vienna Telephone	$1,102,500	Y			$1,200,000			
BTA 11	F	1	10	2,000	$1,000,000	$1,025,000	Microwave Tech.	$1,076,250	Y			$1,100,000			
BTA 11	G	1	10	2,000	$1,000,000	$1,025,000	American Comm.	$1,076,250	Y	40	30				
BTA 12	C	1	20	1,500	$1,500,000	$1,600,000	Telecom Ventures	$1,680,000	N						
BTA 12	D	1	10	1,500	$750,000	$850,000	Ashley Telephone	$892,500	N						
BTA 12	E	1	10	1,500	$750,000	$850,000	Microwave Tech.	$892,500	Y			$900,000			
BTA 12	F	1	10	1,500	$750,000	$825,000	American Comm.	$866,250	Y						
BTA 12	G	1	10	1,500	$750,000	$800,000	American Comm.	$840,000	Y	40	30				
BTA 21	C	2	20	4,000	$4,000,000	$4,300,000	Ashley Telephone	$4,515,000	N						
BTA 21	D	2	10	4,000	$2,000,000	$2,800,000	Telecom Ventures	$2,940,000	N						
BTA 21	E	2	10	4,000	$2,000,000	$2,200,000	American Comm.	$2,310,000	Y						
BTA 21	F	2	10	4,000	$2,000,000			$2,000,000	Y						
BTA 21	G	2	10	4,000	$2,000,000	$2,750,000	Microwave Tech.	$2,887,500	Y	40	40				
BTA 22	C	2	20	3,800	$3,800,000	$4,200,000	Ashley Telephone	$4,410,000	N						
BTA 22	D	2	10	3,800	$1,900,000			$1,900,000	N						
BTA 22	E	2	10	3,800	$1,900,000	$2,300,000	American Comm.	$2,415,000	Y						
BTA 22	F	2	10	3,800	$1,900,000	$2,200,000	Vienna Telephone	$2,310,000	Y						
BTA 22	G	2	10	3,800	$1,900,000	$1,950,000	Microwave Tech.	$2,047,500	Y	40	40				

CHECK TEMPLATE

BIDDER'S NAME AND WAIVER REQUEST ARE IMPORTED FROM THE BIDDING SHEET THAT THE BIDDER SUBMITTED.

MHzPOP ELIGIBILITY AND PAST WAIVER USE INFORMATION IS IMPORTED FROM THE ELIGIBILITY SHEET.

CHECK TEMPLATE PERFORMS ALL OF THE CHECKS BUILT INTO THE BIDDING SHEET. UPON COMPLETION, THE CHECK REPORT IS EXPORTED TO THE MAIN SHEET.

NEW BIDS ARE IMPORTED FROM THE BIDDING SHEET.

BIDDER'S ELIGIBILITY INFORMATION IS IMPORTED FROM THE ELIGIBILITY SHEET

PCS Spectrum Auction Check Template

Bidder: ???
Waiver Request: ???

Auction Phase: 1
Multiplier: 3.0
Activity Level: 0

PopMHz Eligibility
Initial ???
Current round ???
Next round 0

Waiver Used
2nd Previous ???
Previous ???
Current ???

BID CHECK REPORT

OVERALL — Rules violated.

Minimum increment: Violated.
Bidding eligibility: Violated.
MHz limit rule: Violated.
Waiver use rule: Violated.
Activity level: Violated.
MHz-pop eligibility Reduced.

									???				Warning Messages		
License	Band	Contained in MTA	Bandwidth (MHz)	POPs (thousands)	Reserve Price	Current High Bid	Identity of High Bidder	Minimum Qualifying Bid	Eligible to Bid	MHz Limit in Service Area	Current Total MHz in Service Area	New Bid	Qualifying Bid Check	Eligibility Check	MHz Limit in Service Area Check
MTA 1	A		30	3,500	5,250,000	$6,400,000	Vienna Telephone	$6,720,000							
MTA 1	B		30	3,500	5,250,000	$6,200,000	Microwave Tech.	$6,510,000			0				
MTA 2	A		30	7,800	11,700,000	$16,500,000	Vienna Telephone	$17,325,000							
MTA 2	B		30	7,800	11,700,000	$15,400,000	American Comm.	$16,170,000			0				
BTA 11	C	1	20	2,000	2,000,000	$2,100,000	Telecom Ventures	$2,205,000							
BTA 11	D	1	10	2,000	1,000,000	$1,100,000	Ashley Telephone	$1,155,000							
BTA 11	E	1	10	2,000	1,000,000	$1,050,000	Vienna Telephone	$1,102,500							
BTA 11	F	1	10	2,000	1,000,000	$1,025,000	Microwave Tech.	$1,076,250							
BTA 11	G	1	10	2,000	1,000,000	$1,025,000	American Comm.	$1,076,250							
BTA 12	C	1	20	1,500	1,500,000	$1,600,000	Telecom Ventures	$1,680,000							
BTA 12	D	1	10	1,500	750,000	$850,000	Ashley Telephone	$892,500							
BTA 12	E	1	10	1,500	750,000	$850,000	Microwave Tech.	$892,500							
BTA 12	F	1	10	1,500	750,000	$825,000	American Comm.	$866,250							
BTA 12	G	1	10	1,500	750,000	$800,000	American Comm.	$840,000							
BTA 21	C	2	20	4,000	4,000,000	$4,300,000	Ashley Telephone	$4,515,000							
BTA 21	D	2	10	4,000	2,000,000	$2,800,000	Telecom Ventures	$2,940,000							
BTA 21	E	2	10	4,000	2,000,000	$2,200,000	American Comm.	$2,310,000							
BTA 21	F	2	10	4,000	2,000,000			$2,000,000							
BTA 21	G	2	10	4,000	2,000,000	$2,750,000	Microwave Tech.	$2,887,500			0				
BTA 22	C	2	20	3,800	3,800,000	$4,200,000	Ashley Telephone	$4,410,000							
BTA 22	D	2	10	3,800	1,900,000			$1,900,000							
BTA 22	E	2	10	3,800	1,900,000	$2,300,000	American Comm.	$2,415,000							
BTA 22	F	2	10	3,800	1,900,000	$2,200,000	Vienna Telephone	$2,310,000							
BTA 22	G	2	10	3,800	1,900,000	$1,950,000	Microwave Tech.	$2,047,500			0				

CHECK TEMPLATE AND BIDDING SHEET ARE VIRTUALLY IDENTICAL, EXCEPT THAT CHECKING TEMPLATE INITIALLY CONTAINS NO BIDDER SPECIFIC INFORMATION.

ELIGIBILITY SHEET

FOR EACH BIDDER THIS WORKSHEET STORES BIDDER'S ELIGIBILITY TO BID FOR A EACH LICENSE AND THE BANDWIDTH LIMIT FOR EACH SERVICE AREA.

PCS Spectrum Auction Eligibility Sheet

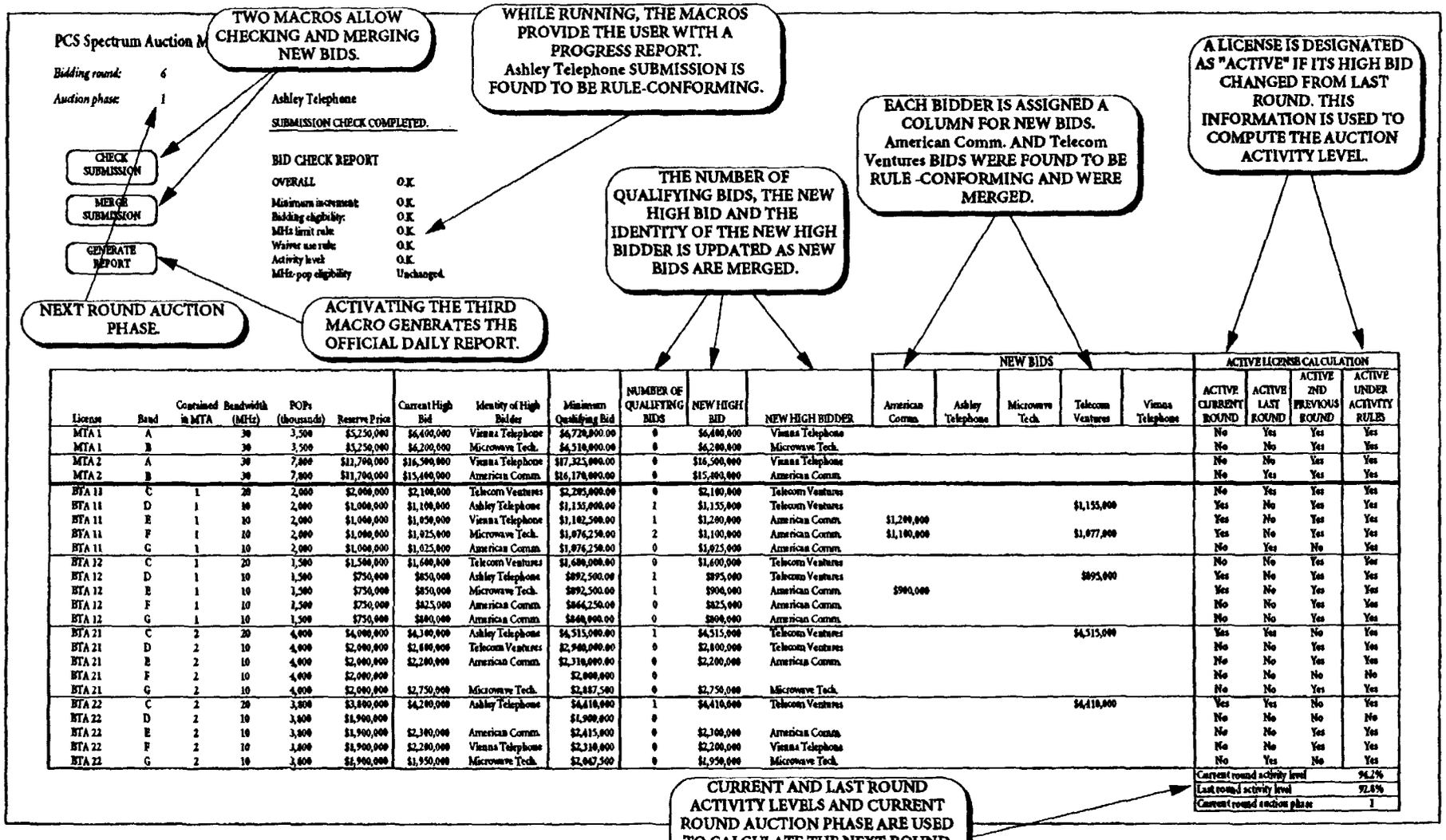
Date: Dec 6, 1993

Bidding round: 6

Auction phase: 1

License	Band	Contained in MTA	Bandwidth (MHz)	POPs (thousands)	Reserve Price	American Comm. Eligible to Bid	American Comm. MHz Limit in Service Area	Ashley Telephone Eligible to Bid	Ashley Telephone MHz Limit in Service Area	Microwave Tech. Eligible to Bid	Microwave Tech. MHz Limit in Service Area	Telecom Ventures Eligible to Bid	Telecom Ventures MHz Limit in Service Area	Vienna Telephone Eligible to Bid	Vienna Telephone MHz Limit in Service Area
MTA 1	A		30	3,500	$5,250,000	Y		Y		Y		Y		Y	
MTA 1	B		30	3,500	$5,250,000	Y	30	Y	30	Y	30	Y	30	Y	30
MTA 2	A		30	7,800	$11,700,000	Y		Y		N		Y		Y	
MTA 2	B		30	7,800	$11,700,000	Y	30	Y	30	N	0	Y	30	Y	30
BTA 11	C	1	20	2,000	$2,000,000	N		Y		N		Y		N	
BTA 11	D	1	10	2,000	$1,000,000	N		Y		N		Y		N	
BTA 11	E	1	10	2,000	$1,000,000	Y		Y		Y		Y		Y	
BTA 11	F	1	10	2,000	$1,000,000	Y		Y		Y		Y		Y	
BTA 11	G	1	10	2,000	$1,000,000	Y	40	Y	40	Y	40	Y	40	Y	40
BTA 12	C	1	20	1,500	$1,500,000	N		Y		N		Y		N	
BTA 12	D	1	10	1,500	$750,000	N		Y		N		Y		N	
BTA 12	E	1	10	1,500	$750,000	Y		Y		Y		Y		Y	
BTA 12	F	1	10	1,500	$750,000	Y		Y		Y		Y		Y	
BTA 12	G	1	10	1,500	$750,000	Y	40	Y	40	Y	40	Y	40	Y	40
BTA 21	C	2	20	4,000	$4,000,000	N		Y		N		Y		N	
BTA 21	D	2	10	4,000	$2,000,000	N		Y		N		Y		N	
BTA 21	E	2	10	4,000	$2,000,000	Y		Y		Y		Y		Y	
BTA 21	F	2	10	4,000	$2,000,000	Y		Y		Y		Y		Y	
BTA 21	G	2	10	4,000	$2,000,000	Y	40	Y	40	Y	10	Y	40	Y	40
BTA 22	C	2	20	3,800	$3,800,000	N		Y		N		Y		N	
BTA 22	D	2	10	3,800	$1,900,000	N		Y		N		Y		N	
BTA 22	E	2	10	3,800	$1,900,000	Y		Y		Y		Y		Y	
BTA 22	F	2	10	3,800	$1,900,000	Y		Y		Y		Y		Y	
BTA 22	G	2	10	3,800	$1,900,000	Y	40	Y	40	Y	10	Y	40	Y	40
Used Waiver in the Second Previous Round						No		No		No		No		No	
Used Waiver in the Last Round						No		No		No		No		No	
Initial MHzPop Eligibility						452		452		218		452		452	
Current MHzPop Eligibility						452		452		218		452		452	

FCC's Main Sheet



License	Band	Contained in MTA	Bandwidth (MHz)	POPs (thousands)	Reserve Price	Current High Bid	Identity of High Bidder	Minimum Qualifying Bid	NUMBER OF QUALIFYING BIDS	NEW HIGH BID	NEW HIGH BIDDER	NEW BIDS: American Comm.	Ashley Telephone	Microwave Tech.	Telecom Ventures	Vienna Telephone	ACTIVE LICENSE CALCULATION: ACTIVE CURRENT ROUND	ACTIVE LAST ROUND	ACTIVE 2ND PREVIOUS ROUND	ACTIVE UNDER ACTIVITY RULES
MTA 1	A		30	3,500	$5,250,000	$6,400,000	Vienna Telephone	$6,720,000.00	0	$6,400,000	Vienna Telephone						No	Yes	Yes	Yes
MTA 1	B		30	3,500	$5,250,000	$6,200,000	Microwave Tech.	$6,510,000.00	0	$6,200,000	Microwave Tech.						No	No	Yes	Yes
MTA 2	A		30	7,800	$11,700,000	$16,500,000	Vienna Telephone	$17,325,000.00	0	$16,500,000	Vienna Telephone						No	No	Yes	Yes
MTA 2	B		30	7,800	$11,700,000	$15,400,000	American Comm.	$16,170,000.00	0	$15,400,000	American Comm.						No	Yes	Yes	Yes
BTA 11	C	1	20	2,000	$2,000,000	$2,100,000	Telecom Ventures	$2,205,000.00	0	$2,100,000	Telecom Ventures						No	Yes	Yes	Yes
BTA 11	D	1	10	2,000	$1,000,000	$1,100,000	Ashley Telephone	$1,155,000.00	1	$1,155,000	Telecom Ventures				$1,155,000		Yes	No	Yes	Yes
BTA 11	E	1	10	2,000	$1,000,000	$1,050,000	Vienna Telephone	$1,102,500.00	1	$1,200,000	American Comm.	$1,200,000					Yes	No	Yes	Yes
BTA 11	F	1	10	2,000	$1,000,000	$1,025,000	Microwave Tech.	$1,076,250.00	2	$1,100,000	American Comm.	$1,100,000			$1,077,000		Yes	No	Yes	Yes
BTA 11	G	1	10	2,000	$1,000,000	$1,025,000	American Comm.	$1,076,250.00	0	$1,025,000	American Comm.						No	Yes	No	Yes
BTA 12	C	1	20	1,500	$1,500,000	$1,600,000	Telecom Ventures	$1,680,000.00	0	$1,600,000	Telecom Ventures						No	No	Yes	Yes
BTA 12	D	1	10	1,500	$750,000	$850,000	Ashley Telephone	$892,500.00	1	$895,000	Telecom Ventures				$895,000		Yes	No	Yes	Yes
BTA 12	E	1	10	1,500	$750,000	$850,000	Microwave Tech.	$892,500.00	1	$900,000	American Comm.	$900,000					Yes	No	Yes	Yes
BTA 12	F	1	10	1,500	$750,000	$825,000	American Comm.	$866,250.00	0	$825,000	American Comm.						No	No	Yes	Yes
BTA 12	G	1	10	1,500	$750,000	$800,000	American Comm.	$840,000.00	0	$800,000	American Comm.						No	No	Yes	Yes
BTA 21	C	2	20	4,000	$4,000,000	$4,300,000	Ashley Telephone	$4,515,000.00	1	$4,515,000	Telecom Ventures				$4,515,000		Yes	Yes	No	Yes
BTA 21	D	2	10	4,000	$2,000,000	$2,400,000	Telecom Ventures	$2,940,000.00	0	$2,400,000	Telecom Ventures						No	No	Yes	Yes
BTA 21	E	2	10	4,000	$2,000,000	$2,200,000	American Comm.	$2,310,000.00	0	$2,200,000	American Comm.						No	No	Yes	Yes
BTA 21	F	2	10	4,000	$2,000,000			$2,000,000	0								No	No	No	No
BTA 21	G	2	10	4,000	$2,000,000	$2,750,000	Microwave Tech.	$2,887,500	0	$2,750,000	Microwave Tech.						No	No	Yes	Yes
BTA 22	C	2	20	3,800	$3,800,000	$4,200,000	Ashley Telephone	$4,410,000	1	$4,410,000	Telecom Ventures				$4,410,000		Yes	Yes	No	Yes
BTA 22	D	2	10	3,800	$1,900,000			$1,900,000	0								No	No	No	No
BTA 22	E	2	10	3,800	$1,900,000	$2,300,000	American Comm.	$2,415,000	0	$2,300,000	American Comm.						No	No	Yes	Yes
BTA 22	F	2	10	3,800	$1,900,000	$2,200,000	Vienna Telephone	$2,310,000	0	$2,200,000	Vienna Telephone						No	No	Yes	Yes
BTA 22	G	2	10	3,800	$1,900,000	$1,950,000	Microwave Tech.	$2,047,500	0	$1,950,000	Microwave Tech.						No	Yes	No	Yes
																	Current round activity level			96.2%
																	Last round activity level			92.8%
																	Current round auction phase			1